

CLAIMS

1 1. A fluid delivery apparatus for introducing a flowable cooling media to a
2 skin surface, comprising:
3 a template including a skin interface surface;
4 an energy delivery device coupled to the template;
5 a flowable cooling media introduction member coupled to the template; and
6 resources to controllably deliver energy from the energy delivery device to the
7 skin surface.

1 2. The apparatus of claim 1, wherein the resources are configured to
2 controllably deliver the flowable cooling media to the introduction member.

1 3. The apparatus of claim 2, further comprising:
2 a sensor coupled to the resources and to the skin surface.

1 4. The apparatus of claim 1, further comprising:
2 a sensor coupled to the resources and to the skin surface.

1 5. The apparatus of claim 4, wherein the sensor is a thermal sensor.

1 6. The apparatus of claim 4, wherein the sensor is a temperature sensor.

1 7. The apparatus of claim 1, wherein the resources provides a pulsed
2 delivery of energy from the energy delivery device.

1 8. The apparatus of claim 4, wherein the resources includes a feedback
2 control.

1 9. The apparatus of claim 1, wherein the resources provides a controlled
2 delivery of energy to the skin surface that does not exceed exceeding 1000 joules/cm2
3 during a single delivery of energy.

1 10. The apparatus of claim 1, wherein the resources provides a controlled
2 dose rate of energy to the skin surface of no more than 10 joules/sec/cm2.

1 11. The apparatus of claim 1, wherein the resources provides a controlled
2 delivery of electromagnetic energy to a skin surface to operate in an impedance range at
3 the skin surface of 70 ohms cm2 measured at a frequency of 88 Hz to 40 Kohms cm2
4 measured at a frequency of 10 KHz.

1 12. The apparatus of claim 1, wherein the energy delivery device produces
2 electromagnetic energy and the resources adjusts a frequency of the electromagnetic
3 energy to correspond to a selected temperature at the skin surface.

1 13. The apparatus of claim 12, wherein the resources provides a controlled
2 delivery of electromagnetic energy to operate in a range of thermal conductivity at a skin
3 surface of 0.2 to 1.2 W/(mEC).

1 14. The apparatus of claim 1, wherein the energy delivery device is an RF
2 electrode and the resources provides a controlled delivery of energy to operate with a
3 frequency modulation of 250 KHz to 4 MHz.

3 wherein the energy source is responsive to the control signal to supply energy to the energy
4 delivery device.

1 20. The apparatus of claim 17, wherein the temperature measuring circuitry
2 comprises:

3 a first device for determining the minimum temperature value;
4 a target determining device coupled to the first device configured to determine the
5 target temperature value as a function of the minimum temperature value; and
6 a first comparison device for comparing measured temperature values to the target
7 temperature value and generating a signal indicating whether the measured temperature
8 value exceeds the target temperature value.

1 21. The apparatus of claim 17, wherein the temperature
2 measurement circuitry includes a microprocessor controller.

1 22. The apparatus of claim 1, wherein the resources includes:
2 an energy control signal generator that generates an energy control signal to
3 control energy supplied from an energy source to the energy delivery device; and
4 an impedance measurement circuitry coupled to the energy delivery device and
5 configured to measure one of a impedance of a selected site at the skin surface or the
6 energy delivery device .

1 23. The apparatus of claim 22, wherein the impedance measuring circuitry
2 determines a minimum impedance value to determine a target measurement value as a
3 function of the minimum measurement value and compares the measured measurement
4 values to the target measurement value and alter the control signal when said measured

5 measurement value exceeds the target measurement value.

6 24. The apparatus of claim 22, further comprising:
7 an energy source coupled to the energy delivery device and configured to supply
8 energy to the energy delivery device, wherein the energy source is responsive to the control
9 signal to supply energy to the energy delivery device.

1 25. The apparatus of claim 22, wherein the impedance measuring circuitry
2 comprises:
3 a first device for determining the minimum impedance value;
4 a target determining device coupled to the first device configured to determine the
5 target impedance value as a function of the minimum impedance value; and
6 a first comparison device for comparing measured impedance values to the target
7 impedance value and generating a signal indicating whether the measured impedance value
8 exceeds the target impedance value.

1 26. The apparatus of claim 22, wherein the impedance
2 measurement circuitry includes a microprocessor controller.

1 27. The apparatus of claim 1, wherein the resources includes:
2 a flow rate signal generator that generates a flow rate control signal to control
3 cooling media supplied from a cooling media source to the flowable cooling media
4 introduction member; and
5 a flow rate measurement circuitry coupled to the flowable cooling media
6 introduction member and configured to measure a flow rate of the cooling media at the
7 skin surface.

1 28. The apparatus of claim 27, wherein the flow rate measurement circuitry
2 determines a minimum flow rate value to determine a target measurement value as a
3 function of the minimum measurement value and compares the measured measurement
4 values to the target measurement value and alter the flow rate control signal when said
5 measured measurement value exceeds the target measurement value.

1 29. The apparatus of claim 27, further comprising:
2 a cooling media source coupled to the flowable cooling media introduction
3 member, wherein the energy media source is responsive to the flow rate control signal to
4 supply cooling media to the cooling media introduction member.

1 30. The apparatus of claim 27, wherein the flow rate measuring circuitry
2 comprises:
3 a first device for determining the minimum flow rate value;
4 a target determining device coupled to the first device configured to determine the
5 target flow rate value as a function of the minimum flow rate value; and
6 a first comparison device for comparing measured flow rate values to the target
7 flow rate value and generating a signal indicating whether the measured flow rate value
8 exceeds the target flow rate value.

1 31. The apparatus of claim 27, wherein the flow rate
2 measurement circuitry includes a microprocessor controller.